Non-Traditional Deicers

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Materials Shared

- VDOT Review of Alternatives and recommendations
- Minnesota Local Road Research Board 2014 Review of non-chloride deicers
- DEQ/Friends of Dyke Marsh Summary of non-chloride deicers

Chemicals reviewed

1. **Acetates**
2. **Formates**
3. **Succinates**
4. **Alcohols**
5. Agricultural byproducts (brines, plant-based, & waste products)
6. Urea (**not allowed in Virginia**)
7. Glycerol/Glycol
8. Sodium Propionate
9. Acetone
10. Formamide
11. Dimethly Sulfoxide
12. Anti-coagulation/dyed products (including chloride deicers)
13. Verglimit (type of pavement)

Lessons Learned/Things to Consider

- No perfect replacement for chloride deicers
- Many alternatives contain other ions (e.g. Na, K, Ca, Mg)
- Research varies a lot
  - Results vary
  - Level of research into compounds varies
  - Evolving manufacturing processes
- Biological Oxygen Demand
  - Often an identified problem with non-chloride deicers
  - In cold temps, biological activity = low, reaeration = high
  - Studies have shown little impact on oxygen during winter
- Agricultural byproducts
  - Subject to availability and content can vary widely
  - Brines need same sodium chloride content as traditional brines (no salt reduction)

Developing recommendations

- Consider how easy it is to adopt a product in operations
- Some pure alternatives may work well for homeowners (i.e., small scale treatment)
- Consider products for mid-latitudes (i.e., temps near 32°F)
- Mixtures seem to offer most promise, BUT need targeted research before implementation
- Area for finalizing recommendations:
  - Recommended compounds to explore for large operations
  - Recommended compounds for homeowners
  - Recommendations for piloting new compounds/mixtures
  - Resource host for stakeholders experience/pilots